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October 17, 2006

Via Electronic Filing

Marlene H. Dortch, Secretary
Federal Communications Commission
Office of the Secretary
c/o Natek, Inc.
236 Massachusetts Avenue, N.E., Suite 110
Washington, DC 20002

Re: 2004 Biennial Review: WT Docket No. 03-264

Dear Ms. Dortch:

Ericsson Inc (“Ericsson”) submits this letter to update the Commission on new developments that make adoption of the CTIA power limit proposal, *in all parts*, even more urgent in the public interest. In its industry-consensus proposal, CTIA recommended that the Commission modify Section 24.232 as follows:

- Add a power spectral density per-MHz limit to its rule and restructure the rule to allow measurements of equivalent isotropically radiated power (“EIRP”) limits under *either* the current per-carrier standard *or* under the power spectral density per-MHz limit;
- Set a sliding scale spectral density measurement that increases power limits, proportional to bandwidth; and
- Allow choice between using peak *or* average measurements for radiated power by eliminating the reference to “peak” measurements.¹

Several new facts and circumstances make adoption of all plan elements now extremely important.

First, winning bidders in the Advanced Wireless Service auction are beginning to contemplate network designs. It is critical that the Commission update its power limit rules now so that industry can design the location and number of base stations for networks.

¹ See Letter from Paul Garnett, Director, Regulatory Policy, CTIA-The Wireless Association (CTIA) to Marlene H. Dortch, Secretary, FCC (Feb. 7, 2005), *In the Matter of Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services*, WT Docket No. 03-264 (“CTIA Proposal”). CTIA also asked that the FCC mirror these changes in its Part 27 rules to ensure technological neutrality.

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EIRP limits dictate how systems are constructed. Under the constraints of these limits, industry installs a certain number of transmitter sites to cover a particular area with an acceptable signal to noise ratio, and designs networks to provide the best possible coverage. Increasing EIRP will allow more selectivity in site locations and fewer transmitter locations where use of higher power is feasible. For example, with higher power limits, a winning bidder could design its system to increase coverage in low coverage areas like underground parking garages and indoor spaces. A winning bidder could design its system with fewer transmitters, and with this cost saving, expand to a greater network size, or make other network decisions differently. Also, a winning bidder could more easily configure its system to use available sites for transmitters, since it is increasingly difficult to find sites that are available for this purpose.

Without a decision on these proposed rule changes, including that EIRP limits can be measured on an average basis, industry cannot move forward with certainty on network design plans. Too many network planning decisions are up in the air. Commission delay, including deferring any issues like peak/average, may harm consumers by slowing or impeding the deployment of advanced wireless services.

Second, the Commission has now initiated proceedings to consider possible revisions to its service rules for the 700 MHz band, including the Part 27 power limits that apply to base stations.² It is difficult for parties to address any modifications to the Part 27 power limits because the Commission has not yet resolved whether it will update these rules in the 2004 Biennial Review. While the power limit rule changes remain in limbo, other Commission proceedings may be impacted, because power limits are so fundamental to the design and certification of equipment and systems.

In particular, as the Commission continues to consider the full CTIA proposal, it has full support to clarify its rules to permit average measurements of power limits. Its administrative record is 100% clear. All parties that addressed the issue supported continuing the measurement of EIRP on an average basis. The rule for handsets should reflect the same changes as necessary for base stations.

The change should not be controversial in any respect since the Commission has already interpreted its base station EIRP rule in practice to permit average power measurements. The Commission confirmed in a March 10, 2004 email to the Swedish TCB that it allows average measurements to be "more fair" when measuring CDMA and broadband signals. Ericsson included excerpts of the electronic mail messages between the FCC and TCB in its December 19, 2005 comments and includes the actual messages here as Attachment A. Quite simply, the Commission's rules, by allowing average measurements, treat constant envelope and non-constant envelope technologies in a neutral way. Specifically, the peak measurement method only captures and represents power peaks that occur with low probability and for an extremely

² See *Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*, WT Docket No. 06-150, FCC 06-114, Notice of Proposed Rulemaking, Fourth Further Notice of Proposed Rulemaking, and Second Further Notice of Proposed Rulemaking (rel. Aug. 10, 2006).

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brief duration (sub-microseconds). Therefore, the "peak" is not in any way representative of the base station's radiated power and this has been recognized in the FCC correspondence with the TCB. The Commission will give industry very important "regulatory certainty," especially as the industry addresses network deployment in the AWS band, if it updates its published rules consistent with direction it has already provided through official channels. Finally, clarifying the rule to permit average measurement will not increase the risk of harmful interference. Equipment already operates under average radiated power measurements, and there are no reports of harmful interference.

The Commission should not be concerned that adopting CTIA's proposal will increase the risk of harmful interference in any respect. Network design limitations and existing FCC rules regulate interference and emissions, and it is unnecessary for the FCC to perform the same task through limits on radiated power. For example, the FCC already has rules in place that control interference where different frequency blocks are used within the same geographic area³ and where the same frequency blocks are used in different geographic markets.⁴ These and other rules effectively protect against harmful interference that could be caused by a system's operation at any power level.

Additionally, current industry practices and system operational characteristics already constrain use of excessive power. When considering a 5 MHz bandwidth and applying the CTIA proposal, there is the possibility for an aggregated radiated power level of 32,800 Watts across the 5 MHz band. However a GSM system would have to use the equivalent of ten carriers in its bandwidth to achieve this level of radiated power. Operationally, it is impossible to use such a high number of carriers in a contiguous 5 MHz bandwidth. What the CTIA sliding scale proposal does is limit radiated power on a per MHz level, which allows a neutral spectrum policy to be applied to various narrowband and wideband technologies.

All these rules and operational limitations fully constrain use of excessive power. However, if the FCC still has *any* concerns at all about the potential for interference, it could require a licensee to notify licensees authorized on adjacent blocks that its base stations or receivers could be located in the vicinity of an adjacent channel. Notification would provide an opportunity for licensees to take steps to mitigate any potential they might perceive for interference at their stations (e.g. by employing filters or modifying base station vertical attenuation patterns).⁵

³ See 47 C.F.R. § 24.238.

⁴ See *id.* § 24.236.

⁵ The FCC adopted similar notification requirements for licensees intending to operate base or fixed stations in excess of 1 kW ERP in its *Lower 700 MHz Report and Order*. See *In re Reallocation and Service Rules for 698-746 MHz Spectrum Band (Television Channels 52-59)*, GN Docket No. 01-74, *Report and Order*, 17 FCC Rcd. 1022, 1066 ¶ 110 (2002) ("*Upper 700 MHz Band Report and Order*"). There, the FCC required licensees to provide notice to all adjacent channel Part 27 licensees authorized to construct and operate base or fixed stations within 75 km of the higher-power base or fixed station. The Notice includes the location and operating parameters of all base and fixed stations operating in excess of 1 kW ERP and must be filed with the Commission and adjacent channel licensees at least 90 days prior to the commencement of station operation. *Id.* When applicable, this requirement includes notification to Part 27 commercial and guard band manager licensees operating on Channel 60 in the Upper 700 MHz Band. See *id.* n.308; *In the Matter of Service Rules for the 746-764 and 776-794 MHz Bands, and*

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Ericsson urges the Commission to move forward as soon as possible to adopt CTIA's industry-consensus proposal. The CTIA proposal promotes a number of objectives, including technology neutral support for new technologies and services, economic growth, efficient and intensive use of spectrum, and a favorable environment for interested parties to develop their business plans. Because the CTIA proposal permits carriers to operate with higher power within regulatory and market limits, it is a practical means to maximize both flexibility and freedom from harmful interference for the widest number of potential services on this spectrum.

Respectfully submitted this 17th day of October, 2006.

Mark Racek
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cc: Cathleen Massey
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ATTACHMENT A

**Electronic Mail Messages Between The FCC and The
Telecommunications Certification Body Clarifying
That Average Measurements May Be Used Regarding
The Power Limit in FCC Rule 24.232 Despite Use of
“Peak” In the Rule**

Tomas Bodeklint

Från: Steven Dayhoff [Steven.Dayhoff@fcc.gov]
Skickat: den 10 mars 2004 15:47
Till: Tomas Bodeklint
Ämne: RE: Question-Issue for March TCB conf.call

Hi Tom:

The "relaxation" for noise-like signal measurements is the allowance to use an Average detector instead of Peak or RMS detectors. Since the rules specify the peak power is the RMS equivalent power, we could force the use of only a RMS or Peak detector for measurements. But instead, we allow an Average detector to be more fair when measuring CDMA and broadband signals, which would yield a lower power reading as compared to RMS or Peak detectors. This means that 100 watts measured with an Average detector for a CDMA signal may be 1000 watts peak power, but we would allow this to be approved.

Regards,

Steve Dayhoff
FCC

-----Original Message-----

From: Tomas Bodeklint [mailto:tomas.bodeklint@sp.se]
Sent: Wednesday, March 10, 2004 9:12 AM
To: Steven Dayhoff
Subject: SV: Question-Issue for March TCB conf.call

Hi Steve

Thanks for the quick response. I appreciate that.
I think the issue with out of band emission is clear now.

My clients do however push me on the peak power requirement in 24.232. They have a CDMA system and are concerned about this requirement.

As you know CDMA systems are "noise" like systems. The peak to average ratio for these types of system could sometimes be up to 10dB or more.
If you look into the CCDF plots for these systems you can see that they only uses this peak power under very short period (for example 10-11 dB above average power during 0.0001% of the time).
[I have enclosed some pages from the R&S and Agilent application notes which shows some typical CCDF plots for CDMA systems.]

The manufactures of these systems together with operators etc are always talking of average power when they referred to the power specification. This because it is more "real" or "usable" power in their perspective.
The concerns they have is that the requirements in 24.232 states that the peak output power shall not be more than 100 W (50dBm) and therefore with a peak to average ratio of 10dB they are limited to use only 10W(40dBm) Average output power.

My question is if this requirement is absolute or if there is some interpretation that allows some relaxation for "noise" like systems as CDMA?

My client is very urgent to know this answer and I would be grateful if you could send me some response on this.

Best regards

Tomas Bodeklint
Telecommunication Certification Body

SP Swedish National Testing and Research Institute
Phone: +46 (0) 33 16 55 92
Email: tomas.bodeklint@sp.se

-----Ursprungligt meddelande-----

Från: Steven Dayhoff [mailto:Steven.Dayhoff@fcc.gov]
Skickat: den 9 mars 2004 20:13
Till: Tomas Bodeklint
Kopia: jallen@acil.org; Rich Fabina
Ämne: FW: Question-Issue for March TCB conf.call

Hi Tom and Janet:

The following Q & A is our most recent and final response to the issue stated in No. 2 of your email to Rich Fabina today, concerning average and peak measurements under Part 24E.

Question: Are average detectors still accepted for out of band (radiated) emission measurements for Part 22 and 24 devices?

1. The previous version of Part 24 (10-1-02 Edition) contained the following text related to the measurement of out of band emissions:

24.238(d) The measurements of emission power can be expressed in peak or average values provided they are expressed in the same parameters as the transmitter power.

2. The previous version of Part 22 (10-1-02 Edition) did not address the issue of the measurement detector specifically. However, in the 2000 Biennial Review of Part 22 the FCC proposed the following text:

22.971(b) Measurement procedure. Compliance with the limitation in paragraph (a) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or more. However, for measurements within 1 MHz of the center of the main emission bandwidth, a resolution bandwidth of not less than 1% of the main emission bandwidth may be employed. For the purpose of this section, the main emission bandwidth is the continuous width of the signal outside of which all emissions are attenuated by at least 26 dB below the transmitting power. **Either peak or average measurements may be used, provided that both the emissions and the reference transmitter power are measured the same way.** When measuring emissions, the transmitter must be set to operate as close to each of the upper and lower channel block edges as the design permits for normal operation.

This is consistent with the text contained within 24.238 in (1) above and is also consistent with the Commission's plan to provide more flexibility to licensees.

3. The Report and Order related to the 2000 Biennial Review was released Sept. 24, 2002 (FCC 02-229). Through the comments submitted by various parties and the discussion provided by the FCC, Part 22 and 24 were edited to be more consistent and streamlined. As part of this effort, it appears that the description of the measurement detector (peak or average) was deleted but there is no discussion of this point within the Report and Order. In particular, the newly adopted text in Part 24 no longer contains the text given in (1) above. Similarly, the text proposed by the FCC in (2) was not included in 22.917 as adopted in FCC 02-229. Thus, the current Part 22 and 24 rules (10-1-03

Edition) do not mention the measurement detector to be used for out of band emissions.

Answer: Yes average detector measurements for out of band emission measurements are still acceptable. Since the adoption of FCC Report & Order 02-229, which made changes to Section 24.238, there has been some doubt as to whether we still allow the use of average detectors when measuring out of band emissions and EIRP of the carrier as well. Although the statement "The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power." has been removed, we will still accept the use of average detectors, and also RMS or peak detectors, for making these measurements. Please keep in mind that Section 24.232(c) still requires peak power to be measured with instrumentation calibrated in terms of an RMS equivalent voltage.

Regards,
Steve Dayhoff
FCC

Tomas Bodeklint

Från: JAllen@ACIL.org
Skickat: den 15 mars 2004 17:45
Ämne: FW: FW: Question-Issue for March TCB conf.call

The following is sent to you at the request of Chris Harvey, TCB Council Secretariat.

..... Janet Allen

Janet S. Allen
Telecommunication Certification Body Council
c/o American Council of Independent Laboratories
1629 K Street NW Suite 400
Washington DC 20006
Tel: 202-887-5872
Fax: 202-887-0021
www.tcbcouncil.org

-----Original Message-----

From: LabHelp [mailto:LabHelp@fcc.gov]
Sent: Monday, March 15, 2004 7:40 AM
To:
Subject: RE: FW: Question-Issue for March TCB conf.call

Answer:

Since the RFpower is to be calibrated in terms of an RMS voltage (24.232(c)), this means the proper method is to use an RMS detector. However, RMS detectors on Spectrum analyzers were rare in the past, and still are only provided on higher-end models. So we have compromised and allow an Average detector instead. Peak is also allowed if the device can comply. We must allow Average detect for every modulation type in general to be fair, however an RMS detector would be preferred. This policy also applies to Part 22H as well, although it is not in the 22H Rules.

Please respond to this further inquiry regarding the Pt.22/24 issue.

Further to your recent response regarding detector functions for Part 22/24 measurements, is the FCC policy of only allowing average power and spurious emission measurements on signals that employ a modulation format that varies in amplitude with time (e.g., CDMA), but requiring peak power and spurious emission measurements on signals that employ a modulation format that does not vary in amplitude with time (e.g., GSM) still in place?